Chapter Ten: Contents

(Terms and Acronyms – LA-UR 00-1725)

Disclaimer

These archived, draft documents describe TRANSIMS, Version 1.1, covered by the university research license. However, note that the documentation may be incomplete in some areas because of the ongoing TRANSIMS development. More recent documentation (for example, Version 2.0) may provide additional updated descriptions for Version 1.1, but also covers code changes beyond Version 1.1.

Chapter Ten—Terms and Acronyms

>>>>>This section is "in process". We are collecting terms/acronyms as we come across them and will define, add/delete/modify later. Please let me know if you have a term/acronym that belongs here. Also, please help me out by providing missing definitions. Thanks. j.

1. TERMS

A

Accessory The place where something happens along a link.

Activity Something that a person in a household does; each activity has parameters associated with it including priority, location, starting time, ending time, and duration.

Activity Generator A TRANSIMS module that generates a list of activities for each member of the synthetic population

Activity Location A place on a link in which traveler activities can take place (such as work, home, and shopping).

Activity Set

Attributes Represent information about travelers such as their age, income, gender, or profession.

B

Barrier A divider such as a curb or grade separation that prevents vehicles from moving between two adjacent lanes on a link.

Binary Node Number Node number derived recursively as follows; if binary node number k is split into two nodes, the left one is number 2k, and the right is number 2k+1.

Block Group U.S. Census Bureau block group number.

Block Group Locator Each household in the baseline population is assigned a home location.

Boundary Exchange Exchange of boundary information between CPUs.

Busway A street restricted to use by buses.

C

Cellular Automata Method of accomplishing simulated vehicle movement in the Traffic Microsimulator.

Census Block Group

Census Tract

Circle Network A sample network that contains merge and turn lanes and is used to calibrate and test the Traffic Microsimulator.

Collector Street A roadway on which vehicular traffic is given preferential right of way, and at the entrances to which vehicular traffic from intersecting roadways is required by law to yield right-of-way to vehicles on such a roadway in obedience to either a stop sign or a yield sign, when such signs are erected.

Constant Size Box Format Data for each box of a given fixed size in the Output Visualizer.

D

Demographics Characteristics of a household or person.

Detector A device that identifies the presence or passage of a vehicle over an area of the lanes on a link; used as the triggers for actuated controllers.

D_P Distance from the intersection where a vehicle starts to consider changing lanes in order to follow its plan.

Diurnal Emissions Evaporative emissions that occur because of the temperature changes that occur during the day.

Dynamic Vehicle Behaviors Acceleration, deceleration, mode transfer, and signal intersection behavior.

E

Emissions Estimator A TRANSIMS module that translates traveler (vehicle) behavior into estimates of air quality, energy consumption, and carbon dioxide emissions.

Evaporative Emissions Emissions that occur from evaporation of the fuel in vehicles.

Event Data Data that reports when an interesting event occurs for a traveler; events are recorded as they occur, at irregular travel intervals.

Evolution Data Data that provides detailed information about how the state of the simulation evolves in time; evolution data may be recorded on every timestep or less frequently, as desired. (also known as snapshot data)

Expectations Encompasses information in the Selector/Iteration Database such as how long a traveler expects to travel between two activities based on the route between them generated by the Route Planner.

Experiences Compose information extracted from detailed Traffic Microsimulator output.

Expressway A divided, arterial highway for through traffic with partial control of access.

F

Feedback

Ferry A waterway crossed by ferry.

Fleet Composition The number of buses and trucks, including the fractions in various categories that describe engine size, chassis size, and model year.

Fleet Dynamics

Fleet Status Estimate of the vehicle loads as the HDV travels about the city.

Framework The series of TRANSIMS modules and their file interfaces.

Freeway A divided, arterial highway for through traffic with full control of access. Full access control means the authority to control access is exercised to give preference to through traffic by providing access

connections with selected public roads, but prohibiting grade crossings and/or direct private driveway connections.

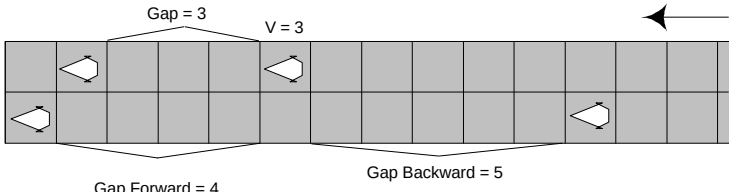
Freeway ramp A unidirectional roadway providing connection between a freeway or expressway and an arterial.

Frontage Road An arterial that runs parallel to a freeway or expressway.

Fuel Evaporation Schedule Treats emissions associated with resting losses, running losses, hot soaks, and diurnal pressure changes.

G

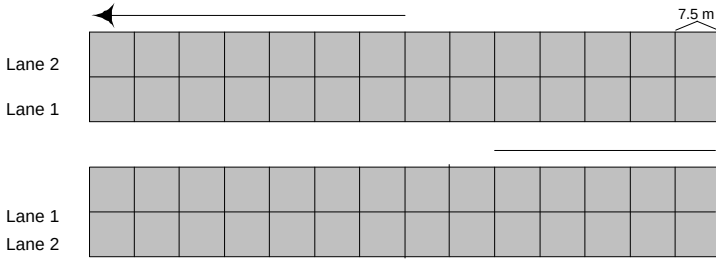
Gap Number of empty cells between this vehicle and the next vehicle on the grid. If this is the first vehicle on the grid, gap is the number of empty cells between this vehicle and the end of the grid.



Geographic Point Contains the coordinates of a position on a map.

Geographic Rectangle A rectangle in a map coordinate system.

Grid Division of the link into cells forming a grid. The Traffic Microsimulator uses a separate grid for each lane on the roadway. Each cell is 7.5 meters long. Vehicles may occupy more than one cell of a grid. In particular, the length of a transit vehicle (in cells) may be set using the configuration file key `CA_BUS_LENGTH`.



H

Hard Accelerations — Accelerations greater than the accelerations associated with 10% of vehicles that have the largest velocity-acceleration product.

Heavy Rail — A roadbed restricted to use by heavy rail cars.

Heavy-Duty Vehicle Tailpipe Submodule — Treats emissions from trucks and buses.

Hibernating Travelers — Those travelers who have already executed one leg of their plan and are waiting to depart on another.

Home Location — The home location of a household and all persons in the household; this number is the ID of a TRANSIMS activity location and is unique for each TRANSIMS transportation network.

Hot Soak Emissions — Evaporative emissions that occur for an hour after a vehicle has been running and has been turned off.

Household — One or more persons with a common home location.

I

Index — A sorted set of entries together with a list of file names referred to by the entries; it is stored on disk and read into memory.

Index Entry — Contains a pointer to a disk file, a byte offset into the file, and the value of a major and minor key associated with the data record to be found at the given offset in the given file.

Index File — A file that contains a sorted index of one or more data files.

Insignificant Accelerations

Intermodal Planner Network

Intersection Snapshot Data — Provides information about a vehicle as it is traversing an intersection.

Iterated Proportional Fitting Method

Iteration Execution of one TRANSIMS program leg (e.g., Activity Generator, Route Planner, Traffic Microsimulator).

Iteration Database Contains a summary history of each traveler's attributes, expectations, and experiences during the iterations within a study.

Itinerant Travelers Those travelers passing through the metropolitan region whose trips originate outside the region.

Iterator A pointer to an index entry; it is used to iterate through an index in a fixed order.

J

K

L

Land-Use Data

Lane A place where traffic flows on a link. The lanes on each side/direction of the link are numbered separately, starting with lane "number one" as the leftmost lane (relative to the direction of travel). Each successive lane to the right of it is numbered one greater than its predecessor. Pocket lanes (i.e., turn pockets, merges, and pull-outs) are numbered in sequence, even if they do not exist for the full length of the link. If present, a two-way left-turn lane is considered to be lane "number zero."

Lane Connectivity Lane connectivity specifies how lanes are connected across a node. Lanes are numbered from the median and include turn pockets. Incoming and outgoing links

	and lanes are defined relative to the node. For each incoming lane on an incoming link, at least one outgoing lane must be specified for each outgoing link that a vehicle on the incoming link can transition to. If desired, multiple outgoing lanes may be defined for an outgoing link.
Leg	A set of contiguous nodes and links that are traversed with a single travel mode.
Light Rail	A roadbed restricted to use by light rail cars.
Light-Duty Vehicle Tailpipe Submodule	A TRANSIMS submodule that treats tailpipes emissions from cars, small trucks, and sport utility vehicles.
Link	That part of the network corresponding to an edge in graph theory. Links represent street and road segments. Each link has a constant number of permanent lanes but may have a variable number of pocket lanes. A link may have lanes in both directions; alternately, the lanes in opposite directions may be on separate links (in which case no passing into oncoming lanes is possible).
Link Accessories	Have a sense of direction indicating on which side of the link they reside (e.g., parking places and transit stops).
Link Densities Summary Data	Reports counts and velocities within boxes that partition the link.
Link Energy Summary Data	Reports histograms of energies (integrated power) of vehicles accumulated as vehicles enter the links.
Link Travel Times Summary Data	Reports counts of vehicles and travel times on links accumulated as vehicles exit the links.
Link Velocities Summary Data	Reports histograms of velocities of vehicles within boxes that partition the link.
Local Street	A roadway on which vehicular traffic is given preferential right of way, and at the entrances to which vehicular traffic from intersecting roadways is required by law to yield right-of-way to vehicles on such a roadway in obedience to either a stop sign or a yield sign, when such signs are erected.
Local Streets Network	Allows all of the modules of TRANSIMS to be tested.
Location	A lane-specific point along a link.

M

MABLE/Geocorr The MABLE/Geocorr geographic correspondence engine generates files and/or reports showing the relationships between a wide variety of geographic coverages for the United States.

Mmapped Memory mapped; files are mapped directly into memory.

Modal Legs

Mode Mode type of transportation between activities; i.e., car, bus, walk

Mode Choice Defines the allowed modes of travel and their order; given in the form of a string of characters.

Movement Rule "Accelerate when you can; slow down if you must; sometimes slow down for no reason."

Multimode Network Constructed to test mode choice and a set of feedback selectors; allow the entire TRANSIMS framework to be exercised.

N

Nitrogen-Oxides Nitric Oxide and Nitrogen Dioxides.

Node The part of the network corresponding to a vertex in graph theory. Nodes typically take place at intersections in the road network. A node must be present where the network branches and where the permanent number of lanes changes.

A lane is considered permanent if it is not a temporary, pocket lane (see the definition of pocket lane below). However, a node may be present where neither of the aforementioned occurs.

Nodes are not required where turn pockets start or end because these are not considered permanent lanes. Each node has a traffic control associated with it (e.g., null, unsignalized, pre-timed, actuated, or coordinated).

Node Number Sequential node number; determined recursively starting with 1 for the root node and proceeding to the left until a terminal node is reached.

Non-residential Travel

N_{ran} Random number between 0.0 and 0.

Notational File The file that would result if the data records referred to by all of the entries in an index were gathered into a single file.

O

Off-plan Vehicle A vehicle that is not in an acceptable approach lane when it is ready to enter an intersection; it cannot follow its assigned plan.

Output Visualizer A TRANSIMS module that allows an analyst to dynamically view the output from the Activity Generator, Route Planner, and Traffic Microsimulator modules; all displays are both temporally and spatially dynamic.

P

Parking Areas Located along links, parking areas are used as origins and destinations for vehicle trips. Parking may be placed where it is physically located in the network, or it may be placed in aggregate generic parking areas representing several of the driveways, lots, parking places, etc., on a link. Places where vehicles leave the network are called boundary parking areas.

P_D Deceleration probability; probability that a vehicle will decelerate during a timestep.

Phase A portion of a traffic signal cycle when the allowed movements are unchanged; a phase is composed of intervals where the traffic displays are constant.

Phasing Plan Specifies the turn protection in effect for transitioning from an incoming link to an outgoing link during a particular phase of a specific timing plan.

P_L Lane changing probability; probability that a vehicle will change lanes during a timestep for reasons other than plan following.

Plan Consists of a sequence of trips.

Plan Set

Pocket A length of lane intended for special uses such as buses and pulling out, vehicles waiting for turns, vehicles accelerating in order to merge, etc.

Pocket Lanes A pocket lane is either

- a right- or left-turn pocket (a lane that starts after the "from" node and ends at the "to" node),
- a right or left pull-out (a lane that starts after the "from" node and ends before the "to" node), or
- a right or left merge pocket (a lane that starts at the "from" node and ends before the "to" node).

If a lane starts at the "from" node and ends at the "to" node, it is considered a permanent lane (not a pocket lane).

Population Persons grouped into households

Population Synthesizer A TRANSIMS module that builds virtual households for a given metropolitan area.

Primary Arterial A major arterial roadway with intersections at grade crossings and direct access to abutting property and on which geometric design and traffic-control measures are used to expedite safe movement of through traffic.

Process Link A "virtual" connection between an activity location, parking place, or transit stop and another activity location, parking location, or transit stop. It represents the process of changing modes and accounts for the cost (in time and money) of making a mode change.

PUMS Household ID The PUMS household ID number from which the synthetic population was derived.

Q

R

Resting Losses Evaporative emissions resulting from fuel migrating through plastic hoses, gas tanks, and fittings.

Right Node Number Sequential node number for the right node of split; coded 0 for terminal node.

Route Atransit route consists of a sequential set of transit stops visited by a transit vehicle. Each route is assigned an integer ID. No transit route may include the same transit stop more than once.

For example, the “inbound” and “outbound” portions of a round trip must be assigned different route IDs. In addition, two transit vehicles that follow the same path through the network but stop at different places along the path (for example, an express and local train) must have different route IDs

Route Planner A TRANSIMS module that develops travel plans based on the demand represented in the activities data file.

Running Loss Emission Evaporative emissions that occur when a vehicle is operating.

S

Secondary Arterial A minor arterial roadway with intersections at grade crossings and direct access to abutting property and on which geometric design and traffic-control measures are used to expedite safe movement of through traffic.

Selector A TRANSIMS component that controls the flow of information among the TRANSIMS modules.

Selector Choices Files that list the travelers who will be reassigned activities, replanned, resimulated, etc.

Selector Scripts

Selector Statistics Statistics that provide a basic summary of the choices the Selector makes.

Signal Coordinator A device that controls the operation of one or more traffic controls; it uses a coordination algorithm to coordinate the work of several traffic controls using detector input.

Signalized Node Represents a traffic light; each signal must have a timing plan and a phasing plan.

Simplified Activity Generator Produces activities for the Multimode Network.

Simplified Population Generator
Produces populations and activities for the small Multimode Network.

Simulation Output

Snapshot Data
Traffic animation can be produced from the snapshot files, which contain time, position, and velocity information for each vehicle in simulation. (see Evolution Data)

Soak Time
The length of time an engine has been off before the current trip began.

Split Value
Value used along with the split variable to create children nodes; coded 0 for terminal node.

Study/Buffer Areas
The microsimulation distinguishes two types of links in its calculations: Study area links are the links of interest for the traffic analyst. For example, the output subsystem records events such as when a vehicle leaves or enters the study area.

The nature of the microsimulation makes it necessary to simulate traffic on additional buffer area links. Typically, these links form a fringe about two links thick around the study area. A simulation includes buffer links in order to avoid edge effects, such as when vehicles enter the study area on its boundary. The buffer gives these vehicles time to interact with other traffic and achieve realistic behavior before entering the study area.

Summary Data
Reports aggregate data about the simulation; summary data is sampled, accumulated, and reported periodically throughout the simulation.

Summary Data Output
(includes both spatial and temporal) Spatial summaries include data aggregated over user-defined sections of roadway defined along the street networks; temporal summaries include data about travel times along streets at various times of day.

Synthetic Households
Classified as family, non-family, or individuals living in group quarters such as dorms.

Synthetic Population

Synthetic Travelers

T

Tailpipe Emissions

Tee Network
A sample network used to study lane changing behavior and plan following.

Timestep
One microsimulation update cycle in which all movement and lane changes are executed for each vehicle; each timestep typically represents approximately one second of simulation time.

Timing Plan
Specifies the lengths of the intervals (minimum green, maximum green, green extension, yellow, and red clearances times) during the specific phases for a traffic light. Many nodes may have the same timing plan. It is possible for each phase to transition to more than one phase (if required).

Tract
U.S. Census Bureau tract number

Traffic Control
Each node has traffic control associated with it. The traffic control specifies how lanes are connected across the node and the type of sign or signalized control that determines who has the right-of-way.

Traffic Microsimulator
A TRANSIMS module that executes individuals' travel plans, link-by-link, as provided by the Route Planner, at the start time specified by the plan.

TRANSIMS ID
Unique number assigned to each household and person; must be greater than zero.

Transit
Vehicles that

- travel on pre-specified routes,
- stop at specified accessory locations listed in the Transit Stop network data table, and
- attemp to follow a predetermined schedule.

Examples include buses and light-rail cars.

Transit Schedule
Each route has a schedule that gives the times a transit vehicle visits each stop along the route.

Transit Stop
A location on a link in which a transit vehicle (such as a bus or light rail car) waits to embark and disembark passengers Transit stops have a style (station, stop, or yard), and vehicle capacity and vehicle type restrictions.

Transit Zone Each stop may have a transit zone associated with it. These zones enable the determination of zone-to-zone travel costs.

Travel Mode

Traveler Event Data Almost anything that happens to a traveler can be reported as a time-stamped event (e.g., begin/end waiting time at a given location, such as a bus stop).

Traveler Plan The set of trips that carries the traveler through his/her desired activities.

Trip A set of contiguous legs.

Trip Request Contains information about a traveler's activities, including the origin and destination of a trip, the preferred starting time, and the mode choice.

U

Unsignalized Node Represents the type of sign control, if any, that is present at an unsignalized node. Examples are stop and yield signs. Nodes where only the number of permanent lanes is changing are generally considered unsignalized.

V

V Speed of the vehicle in cells/timestep

Variable Demographic variable for splitting a node into two children nodes; coded 0 for terminal node.

Variable Size Box Format A box of any size and location on a given link.

Vehicle Evolution Format Data on vehicle position, type, passengers, and velocity

Vehicle Flux The product of the density of vehicles by their speeds.

Vehicle Generator Creates a TRANSIMS vehicle file that contains an entry for each vehicle in a household.

Vehicle Network

Vehicle Snapshot Data Provides information about vehicles traveling on a link.

Vehicle Type Vehicles can be classified in several ways: by network type (e.g., definitions used in imposing lane use or turn

	prohibition restrictions); by usage (e.g., transit, private auto, carpool, jitney), which affects simulation; by performance characteristics (e.g., length, acceleration profile); by emissions type (e.g., power/weight ratio.
$V_{GlobalMax}$	Maximum speed on any link in cells/timestep.
V_{Ma}	Speed limit on the link in cells/timestep.

W

Walk Link

Walk Network

Walkway A street restricted to use by pedestrians.

Zonal Connector An imaginary (non-physical) connection to or from the centroid of a traffic analysis zone.

X

Y

Z

2. ACRONYMS

CA Cellular Automata

CART Classification and Regression Trees

CPN Computational Node

CHEM	Comprehensive Modal Emission Model
CPU	Central Processing Unit
EPA	Environmental Protection Agency
HDV	Heavy-Duty Vehicle
Geocorr	Geographic Correspondence Engine
HOV	High Occupancy Vehicle
ID	IDentification
ITS	Intelligent Transportation System
LDV	Light-Duty Vehicle
MABLE	Master Area Block Level Equivalency
METIS	
MODELS-3	
MPI	Message Passing Interface
MPO	Metropolitan Planning Organization
NFS	Network File System
PBI	
POSIX	
PUMA	Public Use Microdata Area
PUMS	U.S. Census Bureau Public Use Microdata Samples
PVM	Parallel Virtual Machine
RVP	
STF-3A	Summary Tape File 3A
SI	International System of Units
TBI	
TC	Traffic Control
TIGER	
TRANSIMS	TRansportation ANaylsis SIMulation System
UTM	